Figure 1

XSLT
Stylesheet

XML
File → XSLT
Processor → XML
File

(PRIOR ART)

Figure 2

Servo

XML
Database

Servo
Processor

User
Interface

350 — Juan's WAP Phone

Alice's Palm   322

324

Palm UI

Alice's Storage

Rules

Schema   Data   Interpreter   328

Synchronizer   326

Juan's Pocket PC   342
(Windows CE)

344

Win UI

Juan's Storage

Data   Rules

Schema

Interpreter

348   346 — Synchronizer

WAP
Gateway

352

**Server
Environment**   300

Synchronizer   310

354 — WAP UI

356 — Interpreter

320

Alice's Storage
Server Replica

Rules

Schema   Data

340

Juan's Storage
Server Replica

Rules

Data   Schema

Registrar
330

Group Storage   392

Rules

Schema   Data

Synchronizer   370

388

Integration Toolkit

XML Services
380

Legacy   390

Relational
Database

Fig. 3

Servo Template

```
400   <xsl:template match='wh:obj'>
402     <html:div>
404       <html:span><xsl:value-of select='@barId'/></html:span>
406       <ts:edit select='wh:desc'/>
408       <ts:expandable>
410         <ts:hideable>
412           <xsl:apply-templates select='key("objByLast", @wh:barId)'/>
414         </ts:hideable>
416       </ts:expandable>
418     </html:div>
419   </xsl:template>
```
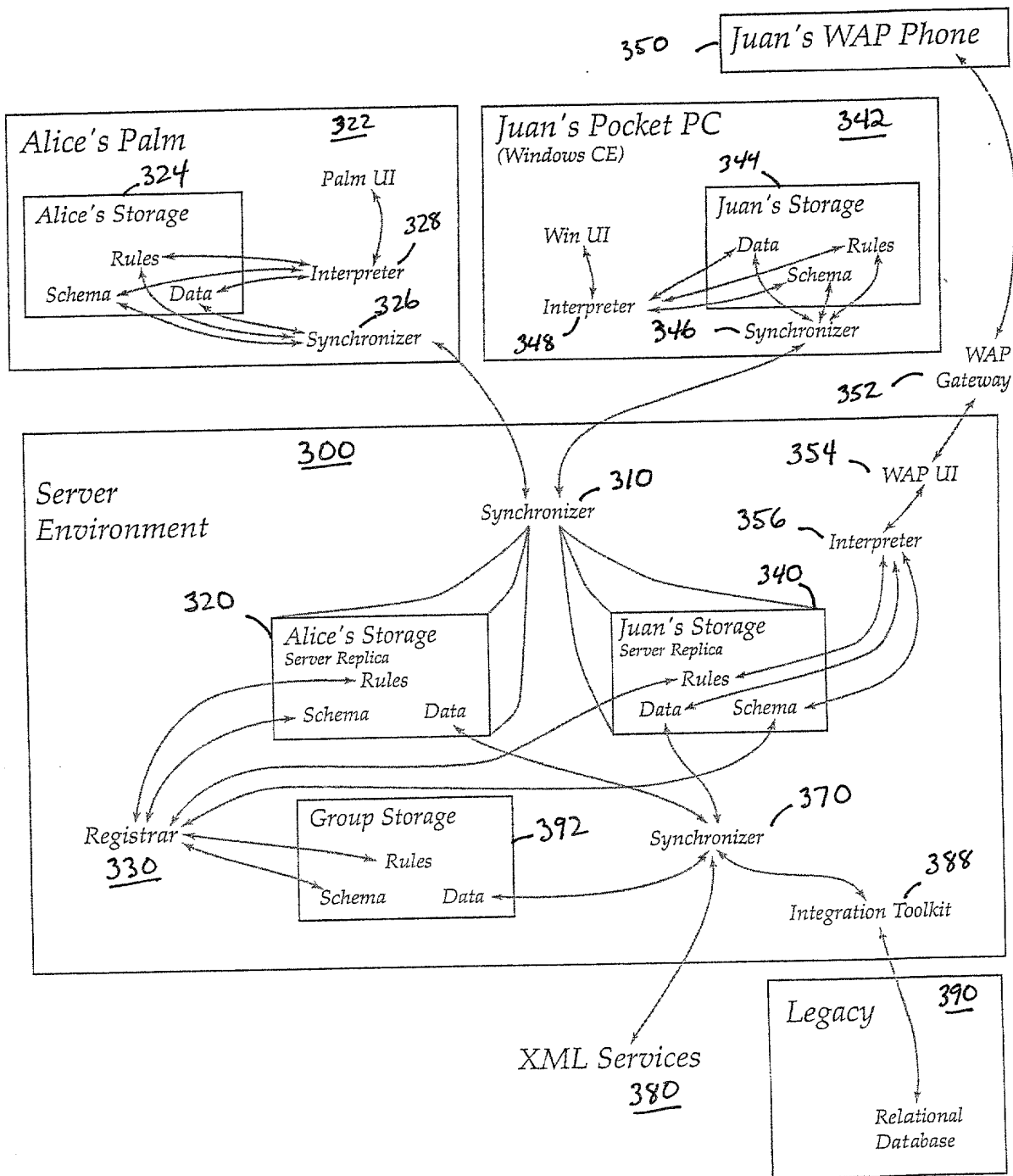
Fig. 4A

Database Fragment

```
420   <wh:objects>
422     <wh:obj wh:barId='271'>
424       <wh:desc>black metal cabinet</wh:desc>
426     </wh:obj>
428     <wh:obj wh:barId='259' wh:last='271'>
430       <wh:desc>top shelf</wh:desc>
432     </wh:obj>
434   </wh:objects>
```
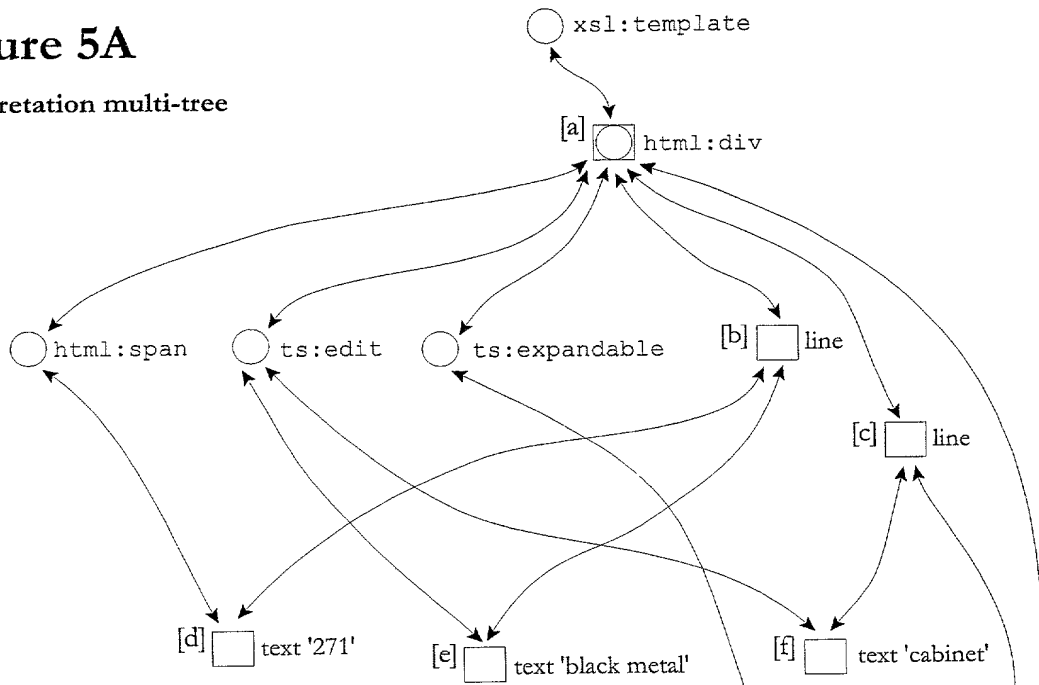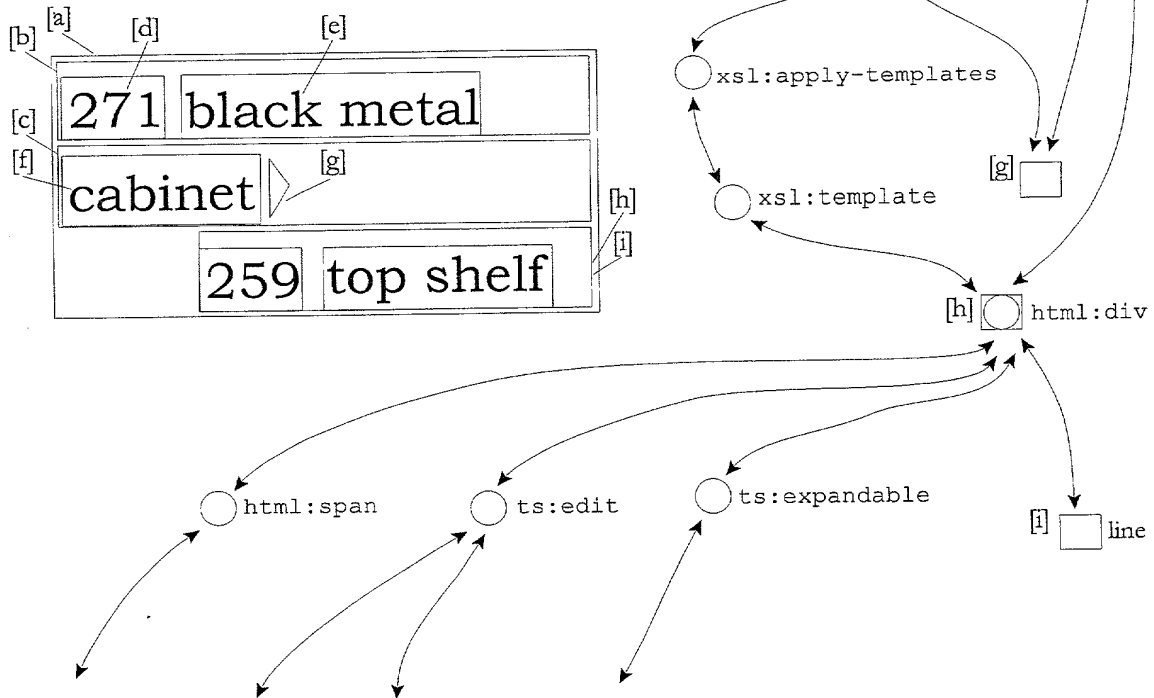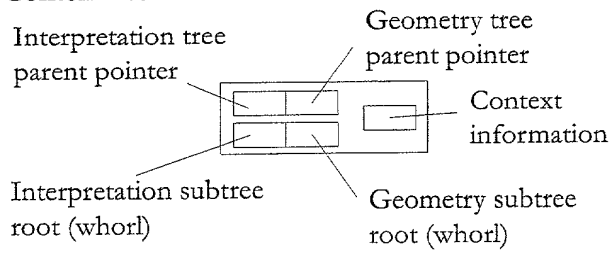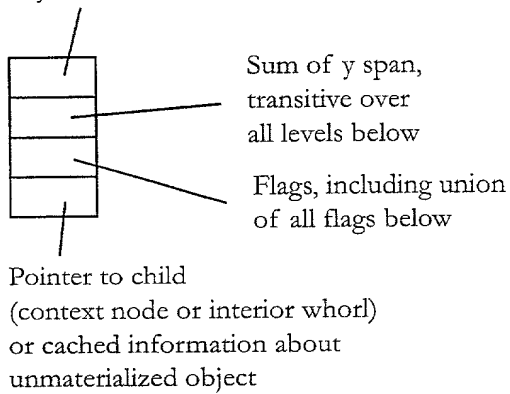
Fig. 4B

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Figure 5A

Interpretation multi-tree

○ xsl:template

[a] ⊡ html:div

○ html:span   ○ ts:edit   ○ ts:expandable   [b] ▢ line

[c] ▢ line

[d] ▢ text '271'   [e] ▢ text 'black metal'   [f] ▢ text 'cabinet'

Figure 5B

Geometric Layout

[b] [a]   [d]   [e]

[c] | 271 | black metal |
[f] | cabinet ▷ [g] |

[h]
[i]

| 259 | top shelf |

○ ts:hideable

○ xsl:apply-templates

[g] ▢

○ xsl:template

[h] ⊙ html:div

○ html:span   ○ ts:edit   ○ ts:expandable   [i] ▢ line

Figure 6
Context Node

Interpretation tree
parent pointer

Geometry tree
parent pointer

Context
information

Interpretation subtree
root (whorl)

Geometry subtree
root (whorl)

Figure 7
Interior Socket

Sum of number of context node children,
transitive over interior whorls, but not
beyond the first level of context nodes

Sum of y span,
transitive over
all levels below

Flags, including union
of all flags below

Pointer to child
(context node or interior whorl)
or cached information about
unmaterialized object

Figure 8
Interior Whorl

Parent pointer to parent
interior whorl or parent context node
containing the whorl referencing this

Each column is an interior socket
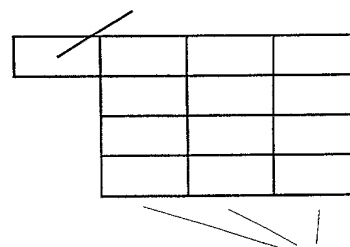
Figure 9A
Sparse relative multi-b-tree
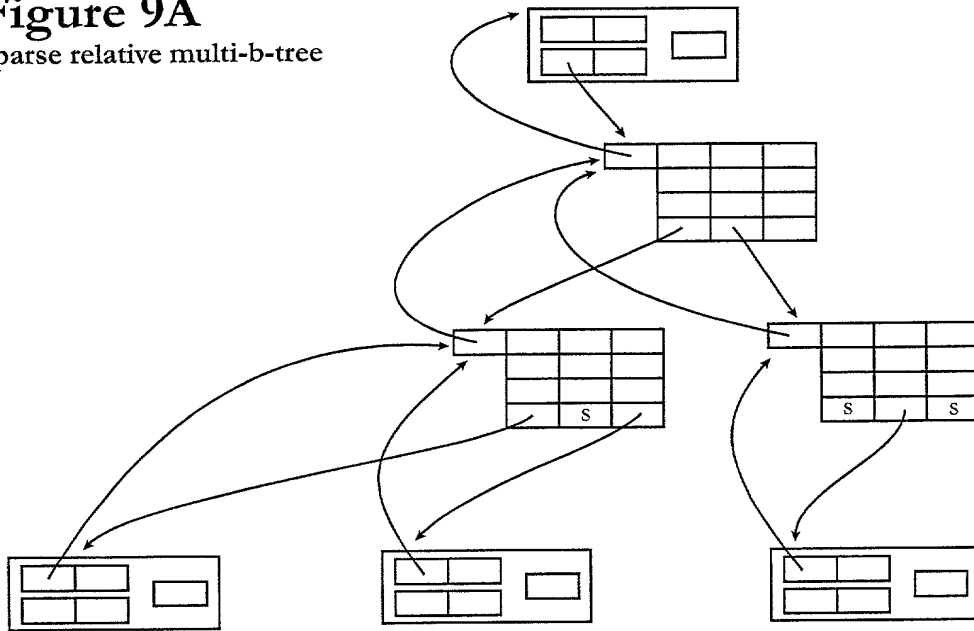
Figure 9B
Detail of context tree